Gene therapy vectors are predominantly based on viruses, they can also be constructed from circular (plasmid) DNA coated in lipid or polymer.

Clinical trials are divided into three phases depending on how far along the developmental pathway the vector is:

- **Phase I** - first stage of testing in a small group of human subjects: to test safety
- **Phase II** - larger subject group, up to 200: how well does the drug work / safety
- **Phase III** - large randomized controlled trials: effectiveness vs. best current treatment

A total of 105 prostate cancer gene therapy trials are ongoing or have already been reported upon, of these 48 were Phase I trials, 49 were Phase I or I/II trials and 8 were Phase III trials.

**Adenovirus**: a common human virus approved for gene transfer. It has been used as the vector of choice in 42% of the clinical trials reported to date. Its main disadvantage is that it is rapidly destroyed by our own immune system. *Shielding the beneficial gene therapy virus from the immune system is one of the challenges facing current gene therapy technologies.*

The ideal vector will be injected intravenously, allowing it to circulate throughout the body, searching out and destroying any secondary tumours (metastases). Currently most viruses are injected directly into the tumour; provocative and encouraging Gene Therapy results have been obtained in some of the early-stage trials reported.